

High frenal attachment and its prevalence among children - A retrospective study

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ABSTRACT

The frenum is a narrow mucosa fold surrounded by muscle fibers that connect the lips to the alveolar mucosa and the periosteum beneath. Midline spacing, commonly called as diastema, recession, interference with prosthodontic therapy, and difficulty speaking are all symptoms of a high frenal attachment. Frenectomy is a surgical treatment that involves removing the aberrant frenal connection. The frenum is a connective tissue membrane that connects one mouth surface to the next. The purpose of this study is to see how popular high frenal attachment is among children who visit a university dentistry hospital. This was a retrospective investigation evaluating the prevalence of high frenal attachment in patients visiting a Chennai dental institution. From June 2019 to March 2021, 11278 patients visited a dental clinic.

Key words: Dentistry, frenectomy, frenulum, high frenal attachment, innovative technology, prevalence

INTRODUCTION

The frenum is a membrane fold that connects the lip and cheek to the alveolar mucosa, gingiva, and underlying periosteum with muscle and connective tissue fibers.^[1] Esthetic considerations have led to a greater emphasis on seeking dental treatment to have a flawless smile.^[2] Gapping between incisors in upper arch is unaesthetic and frequently reported as an esthetic concern by the patients.^[3] This gap between the centrals is called diastema and the presence of an abnormal frenum is one of the etiological causes for the persistence of a midline diastema.^[4]

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The lingual or maxillary labial frenulum is where the majority of frenulum problems arise. Adhesion to the proglossis within the lingual frenulum inhibits tongue movement, causing issues such as suckling, articulation, and speech impairments.^[5] High adhesion to the alveolar region of the maxillary labial frenulum produces dentition diastema and eruption site anomalies within the central incisors.^[6] Knox and Young examined the frenulum histologically and declared that it is constituted by both elastic and muscular fibers which include orbicularis oris comprised of horizontal bands and oblique fibers. In the frenulum, however, Henry, Levin, and Tsaknis discovered rich collagenous tissue and elastic fibers but no muscle fibers.^[7] The high frenal attachment causes diastema, gingival recession, prosthodontic treatment interference, and speech difficulty.^[8]

When an abnormal frenal attachment is present, causing a midline diastema, the frenum is classified as pathogenic and should be removed.^[9,10] The papilla appears flattened with the frenum and is linked close to the border of

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the gingiva, causing gingival recession and making mouth hygiene difficult;^[11] There is an abnormal frenum with a shallow vestibule and an insufficiently joined gingiva. Studies have shown that the prevalence of midline diastema decreases with age and a majority of diastemata will close spontaneously and will not require any intervention.^[12,13] Disproportion of the dentoalveolar structures, presence of supernumerary teeth, hypodontic teeth, proclined upper labial segment, a large labial frenum, and physiological spacing are the most common causes for this spacing.^[14,15]

The diagnosis of aberrant frenemia is made by applying stress on the frenum which causes ischaemia in that area, clinically noticed as a blanch and also by observing the movement of the papillary tip.^[16] As the frenum is particularly large, zone of attached gingiva is not visible along the midline, or the interdental papilla changes when the frenum is expanded, it is considered pathologic.^[17] As a result, the goal of this research is to find out how often high frenal attachment is among patients who visit a dental clinic in Chennai. Our team has produced high-quality articles as a consequence of their extensive research and understanding. Our research and knowledge have resulted in high-quality publications from our team.^[18-22]

MATERIALS AND METHODS

The present retrospective study was conducted after obtaining approval from the Institutional Review Board (IHEC/SDC/PEDO/21/058). The preoperative photographs of 11,278 patients between the age group of 0–21 years visiting university hospital from June 2019 to March 2021 were screened. Demographic details and the type of frenal attachment were noted. The obtained data were entered into an Excel sheet and SPSS software (IBM

SPSS Statistics, Version 20.0, Arming, NY: IBM Corp.) was used for performing statistical analysis.

RESULTS

A total of 11,278 patients participated, about 5824 (51.64%) of patients were male and 5454 (48.36%) of patients were female [Figure 1]. Among 11,278, the prevalence of high frenal attachment was noted in 432 (3.8%) patients and 10846 (96.2%) patients were found to be without frenal abnormalities [Figure 2]. Among 432 patients with high frenal attachment, 36 (0.32%) patients with the age group of 14–21 years were treated with frenectomy [Figure 3]. Correlation between the type of frenal attachment and age groups shows that there is a significant difference between the age group and the frenal attachment with $P = 0.00$ (significant $P \leq 0.05$).

DISCUSSION

Among 11,278, prevalence of high frenal attachment was noted in 432 (3.8%) patients and 10,846 (96.2%) patients were found to be without frenal abnormalities [Figure 2]. The population of 11,278 visiting a dental hospital, 51.64% were found to be males and 48.36% were found to be females [Figure 1]. Patients in this study range in age from 0 to 21, with 0.28% belonging to the age group of 0–6 years, 26.35% belonging to the age group of 7–13 years, and 73.36% belonging to the age group of 14–21 years [Figure 4].

In the present study, it determines that there is a correlation associated between the age group and the treatment, the majority of children belonged to 14–21 years (0.30%) of age and the least age group treated with frenectomy were between 0 and 6 years (0%). The disparity in results between this study could be attributed to population variety. The present study

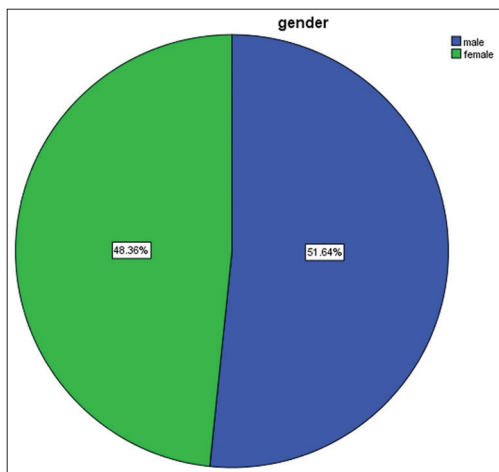


Figure 1: Distribution of gender among the population of 11,278 visiting a dental hospital. Blue color denotes that the percentage of male were about 51.64% and green color denotes that the percentage of females were about 48.36%

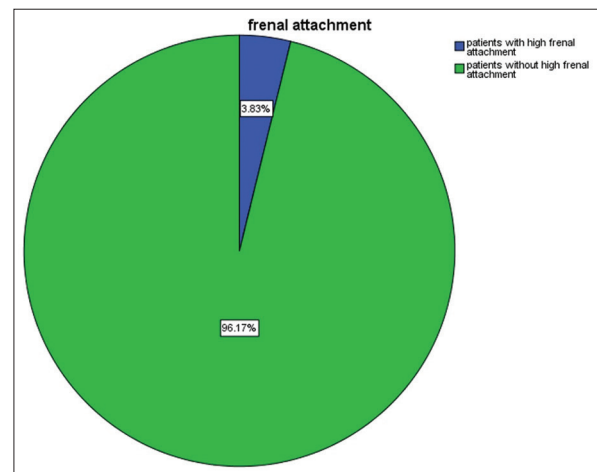


Figure 2: Represents the percentage distribution of patients with high frenal attachment and with no abnormalities. Blue color denotes the percentage of 3.83% patients with high frenal attachment and green color denotes 96.17% of patients without high frenal attachment

reveals that the prevalence of frenectomy depending on the age was significantly more frequently seen with the age group between 14 and 21 years. These findings are consistent with the guideline that said if a patient is under the age of 10 or 11 years old and their canines have not erupted, they should not be referred for an upper labial frenectomy.^[23-26] According to the referral letter, patients aged 11 and under were sent for frenectomy as part of an orthodontic treatment plan, with no extra reason for the practise, which breaches local norms.^[27] As a result, the majority of patients in the 14–21 years' old age group were found to be treated with frenectomy.

A gender-based comparison revealed that 1.98% of males had high frenal attachment, compared to 0.85% of

females [Figure 5], but statistical analysis revealed no significant difference in the rationale for frenectomy between males and females, with $P = 0.99$ (not significant $P > 0.05$). According to the findings of this study, there is no significant difference in frenal attachment between males and girls, according to Jindal *et al.* (Jindal *et al.*, 2016). Similarly, there was no evidence of a link between gender and frenal attachment in the Jordanian population (Hammouri, Ghozlan and Alsmadi, 2017). During a study that included 931 children from the South Indian population, no gender differences in high frenal attachment were found (Christabel).

From the present study, found a higher percentage of high frenal attachment among age group of 14–21 (young adult population) 70.54%, [Figure 6] there was no significant difference between the age groups and frenal attachment with $P = 0.76$ (not significant $P \geq 0.05$). The results of the present study were similar to the results obtained in the Nigerian young adult population. However, these results were contradicting to the study done in Saudi Arabia, where high prevalence of diastemia was noticed in 6-year-old children and only 14.3% among 12–14 year-old.

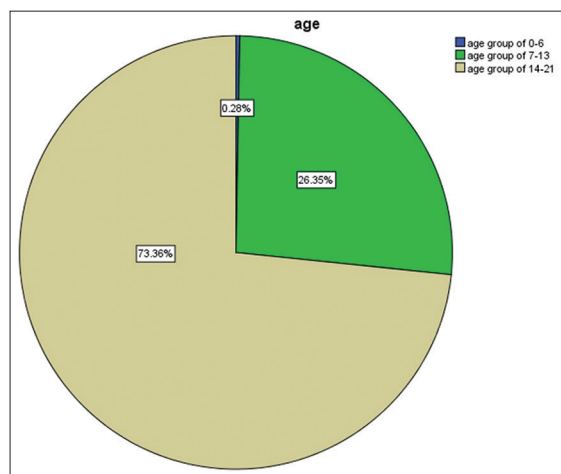


Figure 3: Distribution of age groups among the population of 11,278 visiting the dental hospital. Blue color denotes the percentage of 0.28% patients with the age group of 0–6 years, green color denotes the 26.35% patients with age group of 7–13 years and yellow color denotes 73.36% patients with the age group of 14–21 years

Figure 4: The above table shows the association between age groups percentage distribution of the number of patients treated with frenectomy and not treated with frenectomy., Chi-square, $P = 0.02$

Age groups (years)	Number of patients treated with frenectomy, n (%)	Number of patients not treated with frenectomy, n (%)
Age group of 0–6	0	32 (0.28)
Age group of 7–13	2 (0.02)	2970 (26.33)
Age group of 14–21	34 (0.30)	8240 (73.06)

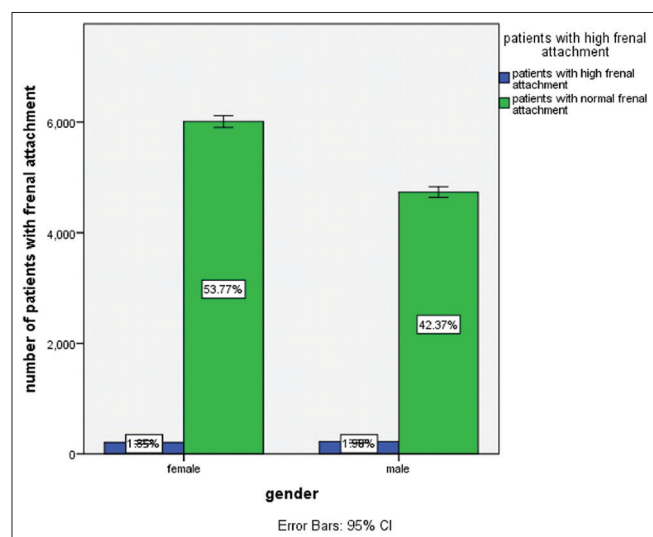


Figure 5: The above Bar Chart shows the association between gender and the number of patients with high frenal attachment. Chi-square, $P = 0.99$ (not significant $P \geq 0.05$)

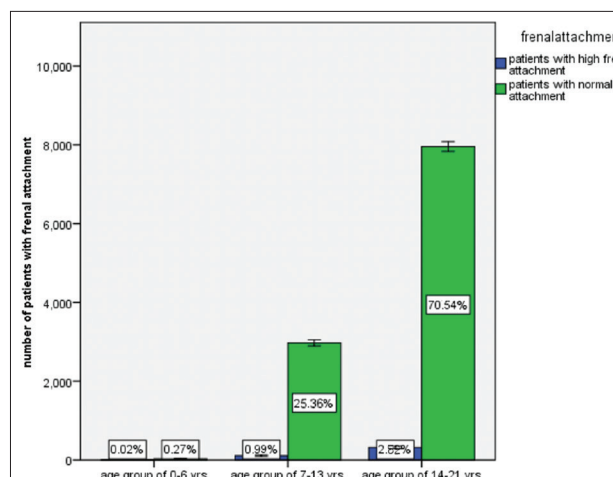


Figure 6: The above bar chart shows the association between age groups and the number of patients with type of frenal attachment, Chi-square, $P = 0.76$ (not significant $P \geq 0.05$)

Figure 7: The above table shows the correlation percentage distribution of frenal attachment and treatment (patients treated with frenectomy and not treated with frenectomy). Chi-square, $P = 0.00$ (significant $P \leq 0.05$)

Treatment	Patients with high frenal attachment, n (%)
Patients treated with frenectomy	36 (0.32)
Patients not treated with frenectomy	396 (3.51)
Total	432

Nonsignificant relation was seen between age groups and frenal attachment was found. From the present study, [Figure 7] correlation of number of patients with high frenal attachment and without high frenal attachment with two groups patients not treated with frenectomy, 396 (3.51%) of patients belong to the group with high frenal attachment and 10846 (96.17%) of patients belong to the group without high frenal attachment. The percentage of patients treated with frenectomy, 36 (0.32%) belong to the group of patients with high frenal attachment. A Chi-square test was done and found to be significant with $P = 0.00$ (significant $P \leq 0.05$).

A recent study has shown that the prevalence of maxillary midline diastema was high and most of them showed willingness to get it treated owing to esthetic concern. The author also stated that there is a lack in the knowledge and awareness regarding midline diastema and various treatment options available among the general population.^[28] The sample size of the present study was small and was confined to one institution, and hence, generalization cannot be done. Furthermore, the examination was based on case sheets available in the DIAS. A single investigator would have prevented the bias.

CONCLUSION

Within the limits of this study, among 3.83% of prevalence of high frenal attachment 0.32% of patients underwent treatment. There was no statistically significant link between gender and frenal attachment. In comparison to the other age groups, the majority of patients between the ages of 14 and 21 years old were treated for their strong frenal attachment (age between 0 and 6 years and 7–13 years). It can be concluded that the frenectomy is influenced by the age of the patients. However, the study serves as an evidence and can be utilized for further studies at the larger population and clinical studies.

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Conflicts of interest

There are no conflicts of interest.

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